GEOLOGY OF THE SCARPELLINI (V33) QUADRANGLE OF VENUS

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The quadrangle (fig. 1) extends from 0° to -25° latitude and 30° to 60° longitude. The region is bounded by Aphrodite Terra and the Ovda Regio plateau to the east, Eistla Regio to the north and Tinatin Planitia to the north west. Full resolution F-MAPs were interpreted using standard photogeological techniques **[1]**. Different material units were identified and their embayment and superpositional relationships studied to determine the geological evolution of the area. This was done with the aid of synthetic stereo imagery produced by the USGS.

The Scarpellini quadrangle is dominated by plains that are interpreted as volcanic in origin. The regional plains contain linear features that vary widely in style and distribution. These include braided lineaments, wrinkle ridges and reticulate and polygonal fracture patterns that are often associated with easily discernible topographic structures. It is inferred that the disruption and deformation of the surface has resulted from a variety of tectonic and volcanic processes.

The quadrangle contains several large coronae 300-400 km in diameter, and numerous smaller circular features, in the order of 100 km across, that resemble coronae. The southern flanks of Nekhebet Mons occupy the north west of the region. A large region of tessera, Manatum Tessera, dominates the north east of the quadrangle. Small volcanic features are distributed throughout Scarpellini; these include shields, conical edifices, domes and scalloped margined domes.

Geological Units. The major geological units include; the *Scarpellini Regional plains unit, Lineated and Mottled plains, Tessera, Lineated Tessera* and extensive lava fields associated with the larger coronae.

The *Scarpellini regional plains* unit is the most extensive plains unit, and covers about 70% of the quadrangle. The backscatter of the unit varies considerably on a regional largely due to the effect of the presence of dark surficial material **[2]**. The *mottled and lineated plains* are characterized by deformed and heavily fractured terrain of variable backscatter. Numerous edifice fields make up the unit, which contains a wide range of volcanic and tectonic structures. The *mottled and lineated plains* are interpreted as having been built up by the action of shield forming volcanism.

The parallel ridge and grooves of the *tessera* have a SE-NW alignment. The most extensive regions are Manatum and Salus Tessera but there are also smaller blocks of tesserae, that have the same alignment and ridge trough wavelength. Within Manatum Tessera, three distinctly different styles of tessera were identified. As well as ridge and trough, there is tessera that has a highly deformed and convoluted configuration and tessera that consists of narrow radial ridges.

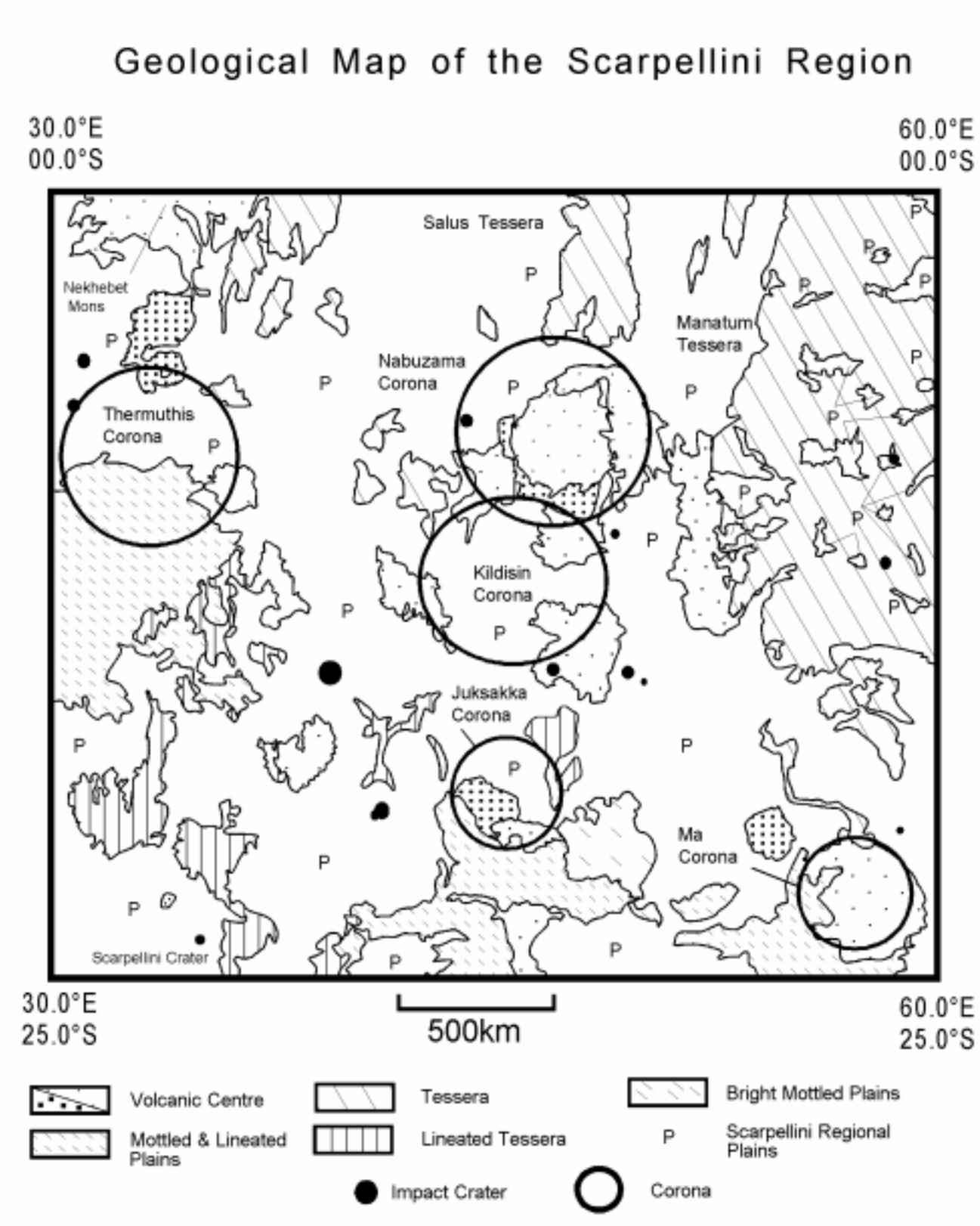
Lineated tessera materials are concentrated in the south-west of the quadrangle. The unit is embayed by plains materials in the region of the Scarpellini Crater, and extend northwards in broken patches for about 1200 km. The material is dissected by north-south trending lineaments that include tension fractures and graben.

Volcanic Centres. There are a number of volcanic centres, approximately 50-60 km in diameter, located in the plains units and on the ridges of the large coronae. Volcanoes that range from 20-60 km in diameter, include domes and steep sided domes **[3]** found on *regional plains units* and *mottled and lineated plains*. The smaller volcanic features present include shields and volcanic cones **[3]**. The majority of these edifices are 1-2 km in diameter. Small volcanic edifices are distributed throughout the region, but predominately in clusters associated with fracture swaths. Large coronae **[4]** have deformed and disrupted the *Scarpellini regional plains* and have extrusive volcanism associated with them. Ma and Juksakka coronae have undergone distinct episodes of evolution and show complex histories, similar to a number of coronae seen in Guinevere and Sedna planitiae **[5, 6]**. They initially deformed *mottled plains materials* which were subsequently embayed by *Scarpellini regional plains materials* which were then further deformed by the developing coronae.

Stratigraphy. The *tessera* units are embayed only by *Scarpellini regional plains*; a plains unit that also embays *lineated tessera and mottled* and *lineated plains*. There is no contact between *tessera, lineated tessera* or *mottled and lineated plains*. Thus the age relations between them cannot be determined. Episodic eruption of lava from the coronae margins and volcanic centres occured throughout corona formation. Recent geology is represented by surficial materials that are often associated with impact craters **[2]**. The *Scarpellini regional plains* are mantled by an extensive parabola of debris. Atmospheric effects in recent times also appear to have entrained fine grained materials from the volcanic plains and deposited them against topographic obstacles.

[1] Wilhelms, (1972), Geologic Mapping of the Second Planet, U.S.G.S. Interagency Report: Astrogeology, **[2]** Campbell et al., (1992), JGR Vol. 97. p. 16,249-16,277, **[3]** Guest et al., (1992), JGR Vol. 97. p. 15,949-15,966, **[4]** Stofan, et al., (1992), JGR Vol. 97. p. 13,347-13,378, **[5]** Copp et al., (1997), LPSC XXVIII, this volume. **[6]** Copp et al., (1996), in review.

Figure 1.


Geological Map of the Scarpellini Region
30.0°E
00.0°S
60.0°E
00.0°S
Salus Tessera
Nekhebet
Mons
Manatum
Tessera
Nabuzama
Corona
Thermuthis
Corona
Kildisin
Corona
Juksakka
Corona
Ma
Corona
Scarpellini Crater
30.0°E
25.0°S
500km
60.0°E
25.0°S
Volcanic Centre
Mottled & Lineated
Plains
Tessera
Lineated Tessera
Bright Mottled Plains
P
Scarpellini Regional
Plains
Impact Crater
Corona